

In the Claims

Cancel claims 5, 12, 14, 16 and 18; add new claims 19-23; and amend claim 9 as follows:

1. (previously presented) A computer program storage device containing a computer-readable program having a memory structure for parallel computing, the parallel computing memory structure comprising:

a first level of hierarchy comprising a plane, the plane containing a thread which represents an independent flow of control managed by a program structure, a heap portion for data structure, a stack portion for function arguments, and local variables and global data accessible by any part of said program structure; and

a second level of hierarchy comprising a space, the space containing two or more of said planes, the planes in the space containing said program structure, the space further containing common data accessible by said program structure between each of the planes.

2. (previously presented) The computer program storage device of claim 1 wherein the memory structure further comprises a third level of hierarchy comprising two or more of said spaces, the spaces containing the same or different program structures, and common data accessible by the program structure between each of the spaces.

3. (previously presented) The computer program storage device of claim 2 wherein the third level of hierarchy contains different program structures.

4. (previously presented) The computer program storage device of claim 2 wherein the third level of hierarchy contains the same program structures.

5. (cancelled)

6. (previously presented) A computer program storage device containing a computer-readable program having a memory structure for parallel computing, the parallel computing memory structure comprising:

a first level of hierarchy comprising a plane, the plane containing a thread which represents an independent flow of control managed by a program structure, a heap portion for data structure, a stack portion for function arguments, and local variables and global data accessible by any part of said program structure;

a second level of hierarchy comprising a space, the space containing two or more of said planes, the planes in the space containing said program structure, the space further containing common data accessible by said program structure between each of the planes; and

a third level of hierarchy comprising two or more of said spaces, the spaces containing the same or different program structures having a library of programs, and common data accessible by the program structure between each of the spaces.

7. (previously presented) The computer program storage device of claim 6 wherein the third level of hierarchy contains different program structures.

8. (previously presented) The computer program storage device of claim 6 wherein the third level of hierarchy contains the same program structures.

9. (currently amended) A computer program product for parallel computing comprising a computer usable medium having computer readable code embodied in said medium, said computer code defining parallel computing computer memory structure including:

a first level of hierarchy comprising a plane, the plane containing a thread which represents an independent flow of control managed by a program structure, a heap portion for data structure, a stack portion for function arguments, and local variables and global data accessible by any part of said program structure; and

a second level of hierarchy comprising a space, the space containing two or more of said planes, the planes in the space containing said program structure, the space further containing common data accessible by said program structure between each of the planes.

10. (original) The computer program product of claim 9 wherein the memory structure further includes a third level of hierarchy comprising two or more of said spaces, the spaces containing the same or different program structures, and common data accessible by the program structure between each of the spaces.

11. (original) A method of parallel processing comprising:

providing a computer memory structure having a first level of hierarchy comprising a plane, the plane containing a thread which represents an independent flow of control managed by a program structure, a heap portion for data structure, a stack portion for function arguments, and local variables, and global data accessible by any part of said program structure; and a second level of hierarchy comprising a space, the space containing two or more of said planes, the planes in the space containing said program structure, the space further containing common data accessible by said program structure between each of the planes;

employing a first thread managed by said program structure in a first plane in said space and accessing data in the first plane and common data between each of the planes; and

employing a second thread managed by said program structure in a second plane in said space and accessing data in the second plane and common data between each of the planes, the first and second threads avoiding interaction with each other except when explicitly requested by said program structure.

12. (cancelled)

13. (original) The method of claim 11 wherein there is further provided a third level of hierarchy comprising two or more of said spaces, the spaces containing the same or different program structures, and common data accessible by the program structure

between each of the spaces, and including accessing the common data between each of said spaces by said first and second threads.

14. (cancelled)

15. (original) A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform method steps for parallel processing using a computer memory structure having a first level of hierarchy comprising a plane, the plane containing a thread which represents an independent flow of control managed by a program structure, a heap portion for data structure, a stack portion for function arguments, and local variables, and global data accessible by any part of said program structure; and a second level of hierarchy comprising a space, the space containing two or more of said planes, the planes in the space containing said program structure, the space further containing common data accessible by said program structure between each of the planes, said method steps comprising:

employing a first thread managed by said program structure in a first plane in said space and accessing data in the first plane and common data between each of the planes; and

employing a second thread managed by said program structure in a second plane in said space and accessing data in the second plane and common data between each of the planes, the first and second threads avoiding interaction with each other except when explicitly requested by said program structure.

16. (cancelled)

17. (original) The program storage device of claim 15 wherein there is further provided a third level of hierarchy comprising two or more of said spaces, the spaces containing the same or different program structures, and common data accessible by the program structure between each of the spaces, and including accessing the common data between each of said spaces by said first and second threads.

18. (cancelled)

19. (new) A computer program storage device containing a computer-readable program having a memory structure for parallel computing, the parallel computing memory structure comprising:

- a first level of hierarchy comprising a plane, the plane containing a thread which represents an independent flow of control managed by a program structure comprising a library of programs, a heap portion for data structure, a stack portion for function arguments, and local variables and global data accessible by any part of said program structure;

- a second level of hierarchy comprising a space, the space containing two or more of said planes, the planes in the space containing said program structure, the space further containing common data accessible by said program structure between

each of the planes and including a function table for each space, the function table being adapted to exchange services with the library in each space; and
a third level of hierarchy comprising two or more of said spaces, the spaces containing the same or different program structures, and common data accessible by the program structure between each of the spaces.

20. (new) A method of parallel processing comprising:

providing a computer memory structure having a first level of hierarchy comprising a plane, the plane containing a thread which represents an independent flow of control managed by a program structure comprising a library of programs, a heap portion for data structure, a stack portion for function arguments, and local variables, and global data accessible by any part of said program structure; and a second level of hierarchy comprising a space, the space containing two or more of said planes, the planes in the space containing said program structure, the space further containing common data accessible by said program structure between each of the planes;

providing a function table for the space, the function table being adapted to exchange services with the library in the space;

employing a first thread managed by said program structure in a first plane in said space and accessing data in the first plane, the first thread also being employed to make function calls to said function table to access common data between each of the planes and common data in the space; and

employing a second thread managed by said program structure in a second plane in said space and accessing data in the second plane, the second thread also being employed to make function calls to said function table to access common data between each of the planes and common data in the spaces, the first and second threads avoiding interaction with each other except when explicitly requested by said program structure.

21. (new) A method of parallel processing comprising:

providing a computer memory structure having a first level of hierarchy comprising a plane, the plane containing a thread which represents an independent flow of control managed by a program structure comprising a library of programs, a heap portion for data structure, a stack portion for function arguments, and local variables, and global data accessible by any part of said program structure; a second level of hierarchy comprising a space, the space containing two or more of said planes, the planes in the space containing said program structure, the space further containing common data accessible by said program structure between each of the planes; and a third level of hierarchy comprising two or more of said spaces, the spaces containing the same or different program structures, and common data accessible by the program structure between each of the spaces;

providing a function table for each space, the function table being adapted to exchange services with the library in each space;

employing a first thread managed by said program structure in a first plane in said space and accessing data in the first plane, the first thread also being employed to make function calls to said function table to access common data between each of the planes and common data in the spaces; and

employing a second thread managed by said program structure in a second plane in said space and accessing data in the second plane, the second thread also being employed to make function calls to said function table to access common data between each of the planes and common data in the spaces, the first and second threads avoiding interaction with each other except when explicitly requested by said program structure.

22. (new) A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform method steps for parallel processing using a computer memory structure having a first level of hierarchy comprising a plane, the plane containing a thread which represents an independent flow of control managed by a program structure comprising a library of programs, a heap portion for data structure, a stack portion for function arguments, and local variables, and global data accessible by any part of said program structure; and a second level of hierarchy comprising a space, the space containing two or more of said planes, the planes in the space containing said program structure, the space further containing common data accessible by said program structure between each of the planes and including a function

table adapted to exchange services with the library in each space, said method steps comprising:

employing a first thread managed by said program structure in a first plane in said space and accessing data in the first plane, the first thread also being employed to make function calls to said function table to access common data between each of the planes and common data in the space; and

employing a second thread managed by said program structure in a second plane in said space and accessing data in the second plane, the second thread also being employed to make function calls to said function table to access common data between each of the planes and common data in the space, the first and second threads avoiding interaction with each other except when explicitly requested by said program structure.

23. (new) A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform method steps for parallel processing using a computer memory structure having a first level of hierarchy comprising a plane, the plane containing a thread which represents an independent flow of control managed by a program structure comprising a library of programs, a heap portion for data structure, a stack portion for function arguments, and local variables, and global data accessible by any part of said program structure; a second level of hierarchy comprising a space, the space containing two or more of said planes, the planes in the space containing said program structure, the space further containing common data accessible

by said program structure between each of the planes and a function table adapted to exchange services with the library in the space; and a third level of hierarchy comprising two or more of said spaces, the spaces containing the same or different program structures, and common data accessible by the program structure between each of the spaces, said method steps comprising:

employing a first thread managed by said program structure in a first plane in said space and accessing data in the first plane, the first thread also being employed to make function calls to said function table to access common data between each of the planes and common data in the space; and

employing a second thread managed by said program structure in a second plane in said space and accessing data in the second plane, the second thread also being employed to make function calls to said function table to access common data between each of the planes and common data in the space, the first and second threads avoiding interaction with each other except when explicitly requested by said program structure.